

THE EFFECTS OF AEROBICS AND GREEK TRADITIONAL DANCES ON CARDIO-RESPIRATORY RESPONSES IN ADULT WOMEN

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Abstract

The aim of the study was to compare the cardio-respiratory responses of adult women, which participated in aerobics exercising and traditional dancing programs. A total of 30 women, aged $45 \pm 9,82$ yrs, were participated in the study and divided in four groups according to their involvement in the intervention programs. The cardio respiratory endurance of the participants was evaluated by the use of 20m shuttle-run multistage fitness test (Tokmakidis,1992) and the heart rate was recorded by the use of a portable heart rate tester (Polar Electron Sport tester 810). The analysis of the data showed that there were no statistically significant differences concerning the type of exercise ($p > .05$), but there were statistically significant differences between initial and final measurements both in Greek traditional dancing and in aerobics program for both experimental groups ($p < .05$). The above results shows that the participation in Greek traditional dancing programs causes cardio respiratory responses similar to an aerobics program and it can be used as an alternative type of exercise.

Keywords: Greek traditional dancing, aerobics, aerobic capacity

Introduction

Occupying with physical activity and exercise considerably contributes in various ways to an individual's (Wood, Reyes-Alvarez, Maraj, Metoyer & Welsch, 1997) fitness as well as to his mental health, since with aerobics training the decrease of the brain tissue is kept under control, a condition which already begins at the third decade of one's life (Colombe, Ericson, Raz, Webb, Cohen et al., 2002).

The benefits of the exercise are evident and the promotion of regular exercise constitutes a necessary prerequisite for a satisfactory public health (Gravelle, Pare & Laurencelle, 1997). At the

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organized exercise programs an effort is observed by the national and local organizations to promote exercise in every age. The elderly people show a positive attitude towards exercise and characterize it as «good and beneficial» for them (Gravelle, Pare & Laurencelle, 1997). This type of pastime not only helps prolong the normal function of their physiology but also helps to avoid the feeling of depression which comes into being when they constantly remain at home and are isolated by their social setting. It seems that, especially for the elderly people, the social contacts in the exercise place contribute to a better quality of their life (McAuley, Blissmer, Marquez, Jerome, Kramer et al., 2000).

The participation in group exercise programs helps satisfy the need for companionship and communication, especially for the elderly people in a quite pleasant way. In a recent research (McAuley et al., 2000) the effect of exercise on social relationships was studied. The study results showed that exercise has a positive effect on the lessening of the feeling of loneliness and on the increase of happiness. However, in another study (Schneider, 1996) the women who work out claimed that after the completion of the program they drew support by their co-trainees and that the group programs gave them a feeling of companionship while exercising.

Aerobics is considered to be an integral constituent part of a complete rehabilitation program and of everyday practice because of the beneficial physiological adjustments it offers both to healthy people and to those who experience some disease (Babyak, Blumenthal, Herman, Khatri, Doraiswamy et al., 2000).

However, while the purpose of practice is by far the appeasement and the promotion of good mood, if the difficulty degree is excessive for the trainee, it can lead him to abandon the attempt. At the same time, he can feel disappointment as he has not been able to fulfill all its requirements. This is most probable for the elderly people (Farmer, Lock, Mosciki, Dannenberg, Larson et al., 1988) where encouragement and motives for occupation with exercise are more limited.

Most of the existent studies, (Koutedakis & Jamurtas, 2004; Silvestri & Oescher, 1990) which pertain to aerobics focus on the adjustments of cardio respiratory function as its improvement reduce the possibility of presenting cardiovascular diseases. The studies were applied mostly to adults and the positive effect of aerobics was found not only on cardio respiratory capacity but also on the remaining physical abilities (Beniamini, Rubenstein, Zaichkowsky & Crim, 1997). Moreover, aerobics positively influences the psychology of adult people by expelling stress (Watterson, 1984).

Aerobics is a form of exercise particularly popular in the last decades not only in women's population, as it used to be, but also in the male population and the children since through its various types it has succeeded in winning their interest and regular attendance (Boileau, McAuley, Demetriou, Devabhaktuni, Dykstra et al., 1999). The content of aerobics contributes to the improvement of health rates since it is in such way built as to offer mostly practice of cardio respiratory endurance, improvement of muscular strength and endurance and increase of flexibility. However, nowadays the various forms of aerobics have developed and reformed so as to serve the different needs of the people who work out (Williford, Scharff-Olson & Blessing, 1989).

The use of music which is an indispensable part of this form of exercise causes to those who work out pleasant emotions, euphoria and influences positively their psychology expelling every negative emotion such as stress and it drives them to adopt exercise for life (Kriska, Hanley, Harris & Zinman, 2001).

More and more part of the Greek population is seeking out ways of exercising in order to improve their body fitness and also get the chance for social contact and appeasement from their daily routine. As a form of exercise particularly appealing to both men and women, Greek traditional dancing could satisfy their expectations as far as the body robustness and spiritual

euphoria is concerned. Furthermore, the effects of aerobics on women's mood remain for the next 24 hours (Pitsi, 2002). Something similar occurs with the group aerobics programs carried out by private and public gyms since, just like traditional dancing, they offer rhythm and music.

For this reason the quest of a Greek traditional dancing program which for its design takes into consideration the conditions of an aerobics program (in terms of duration and intervals between the class segments) leads to the realization of the present study so as to make possible the comparison of the two forms of exercise. Thus, the aim of the present research was to study the influence of exercise on cardio respiratory adjustments of adult women who participate in aerobics and Greek dancing programs. Comparing the types of exercise the possibility of choosing dancing as an alternative form of exercise is investigated.

Method

Participants

The sample of the study were 30 adult women, 10 of those composed the Greek traditional dancing group which followed the intervention program, 10 composed the aerobics group which followed the corresponding intervention program while 5 persons for each group composed the control group. The two experimental groups followed the program which was created in order for the study to be carried out while the two control groups followed typical Greek traditional dancing and aerobics classes. The sample was chosen using the method of random sampling.

The women who constituted the four groups participated in traditional dancing and aerobics classes for at least two years respectively. A necessary prerequisite for their attendance in the study was their level of dancing experience and occupation with group aerobics programs respectively. The participants should afford to perform the programs, which they took part in, in their regular form without having the need of tuition so as the most uniform performance of the programs would be accomplished.

Table 1

Physiological characteristics of the sample in each group separately

Characteristics	Greek Dances	Aerobic	Greek Dances	Aerobic
	(Controlled)	(Controlled)	(Interval)	(Interval)
Age (years)	44,2±8,4	40,2±9,4	42,2±12,3	42,5±8,4
Height (cm)	165 ± 2,5	168 ± 8,5	165± 8	167± 6
Weight (kg)	64± 6,023	66± 4,67	63,5± 4,263	70,9± 3,302
HR _{max} (beats/min)	181± 7,99	176,8± 6,193	173,88± 5,65	172,1± 4,379
VO _{2max} (ml/kg/min)	30,6± 2,939	29,6± 2,227	34,1± 2,078	33,2± 1,610

Study design

Dancing has been evaluated in relation to its intensity as a percentage of the maximum cardiac rate (Pitsi, Smilio, Tokmakidis, Serbezis & Goulimaris, 2008) (Table 2).

Table 2.
Grouping of the 24 dances according to their intensity as a percentage of (HR_{max}) (Pitsi et al., 2008).

DANCES GROUPS		
Low (55-63% HR _{max})	Mediocre (64-69% HR _{max})	Intense (74-86% HR _{max})
Pogonisios	Zonaradikos	Baidouska
Mperati of Hepirus	Zagorisios	Syrtos Sygathistos
Sta tria	Aidono-TasiaA	Syrtoballos
Mperati of Thessali	Zervos Karpathou	Ikariotikos
Tsakonikos	Gaida	Trehatos – Raikos
Tik	Kalamatianos	Enteka
Dipat	Tsamikos	Kotsari
	Chaniotikos	Pentozalis
		Sousta of Crete

The dancing intervention program was organized and lasted for 12 weeks. It was applied twice in a week and each class lasted for 55 minutes.

As far as the group that followed the intervention aerobics program is concerned, during the laying out of the program, the adjustment of intensity was modulated in accordance with the intensity which was used in the corresponding Greek traditional dancing programs. Thus, it was possible to compare the adjustments that are caused by the application of these two different forms of exercise since the intensity was the same during their implementation.

Subsequently, for the creation of the dancing sequence specific factors should have been taken into account such as the representation of each region or social group. Moreover, the popularity degree of each dance should have been taken into account, that is, how prevalent it is in the region, and the representation of the metrical design and of the motor motifs. Finally, the difficulty degree which was defined by complexity and organization (Serbezis & Goulimaris, 2002) should have been counted.

The duration of the intervention program was 55 minutes as it is standard in a typical Greek traditional dancing class and in a typical aerobics hour. Warming up of the program lasted for 7-10 minutes and dancing was used in terms of aerobics program. The choice of dancing for the creation of the Greek traditional dancing program was made by a sum of 24 dances (Table 2). Each one of the 24 programs which created, were slightly modified as far as the dancing repertoire is concerned so that classes during the twelve weeks would not be unvaried. However, all of them followed the same pattern as far as the intensity is concerned «low – moderate – high – moderate - low». The most usual choice of dancing for warming up was the following: Pogonisios, Berati Hpeirou, Berati Thessalias, and Tsakonikos. The essential part of dancing class lasted for 35-40 minutes. The most usual choice of dancing for relaxation was: Tik, Thipat, and Sta Tria.

During the laying out of the aerobics program, the intensity was adjusted in accordance to the corresponding intensity which was defined for the Greek traditional dancing program. Thus,

an aerobics program with rather simple choreography was chosen but there was an emphasis on intensity which ranged from 135 to 145 heart beats per minute.

The form of the aerobics program of moderate intensity included warming up, the main part and relaxation as a usual aerobics program does. The main part of the aerobics intervention program included: pre-cardio, main aerobics part, post-cardio and muscle strength while in relaxation flexing exercises were performed.

Assessment of physiological responses

Having been familiarized with the whole experimental procedure, and after their signed consent, each trainee came to the indoor university gym of DPESS at The Democritus University of Thrace in order to undergo the 20 meters shuttle run test the intensity of which gradually increased (Tokmakidis, 1992) to evaluate the cardio respiratory endurance. The 20m shuttle-run multistage fitness endurance test is reliable ($r=0.97$) and valid ($r=0.96$) as far as the prediction of VO_{2max} is concerned. The test consisted of 20 stages and was performed in a designated area of 20 meters length. The women who worked out ran for as long as they could, following the rhythm dictated by characteristic sounds in predetermined temporal intervals. The sounds that determined the rhythm came from the specific test recording tape. The initial speed corresponded to 7Km/h^{-1} and increased every two minutes by 1Km/h^{-1} . The women who worked out controlled their speed passing through just at the time that the audio signal was sounded by the visible signs of 20 meters. The duration of the test was relative to the physical fitness of each trainee. In case of inability to complete the run of 20 meters at the expected time based on the audio signals, the trainee stopped the trial and the stage at which she ended her try was recorded as her performance. During the whole procedure there was continuous monitoring and recording of each woman's heart beat with the Polar S810 monitor system of telemetric control.

Statistical analysis

For the presentation of the results a descriptive statistic was used (average, standard deviation). A two factor (type of exercise \times measurement) variance analysis with the second factor being repeated (two – way ANOVA repeated measures analysis) was used so as to find the differences in cardio respiratory endurance before and after the application of the intervention programs. The significant level was set as $p<.05$.

Results

Physiological responses

The two-way analysis of variance with the repeated measures on the second factor showed that in the 20m shuttle-run fitness test there was a statistically significant effect of the factor measurement [$F_{(1,20)} = 1,081, p<.05$] while there was no statistically significant effect of the factor type of exercise [$F_{(3,20)} = 0,86, p>.05$].

Table 3

Mean scores and typical deviations of shuttle-run multistage fitness test during 1st and 2nd measurement of the four groups

	STAGES OF SHUTTLE RUN TEST(No)			
	1 st Measurement		2 nd Measurement	
	M.S.	T.D.	M.S.	T.D.
Greek Dances (Controlled)	3,3	± 0,95	4,2	± 0,73
Greek Dances (Interval)	4,8	± 0,67	4,7	± 0,513
Aerobic (Controlled)	3	± 0,732	3,3	± 0,56
Aerobic (Interval)	4,3	± 0,52	4,9	± 0,39

As far as the heart beat is concerned, the two factor variance analysis with the second factor being repeated showed that there was a statistically significant effect of the factor measurement [$F_{(1,20)} = 11,34$, $p < .05$] while there was no statistically significant effect of the factor type of exercise [$F_{(3,20)} = 3,385$, $p > .05$].

Table 4

Mean scores and typical deviations of HR during 1st and 2nd measurement of the four groups

	HR (beat/min)			
	1 st Measurement		2 nd Measurement	
	M.S.	T.D.	M.S.	T.D.
Greek Dances (Controlled)	181	± 7,99	180	± 7,73
Greek Dances (Interval)	173,8	± 5,7	170,6	± 5,47
Aerobic (Controlled)	176,8	± 6,193	175,8	± 5,98
Aerobic (Interval)	172,1	± 4,38	171,9	± 4,23

Discussion

The results of the present study showed that the cardio respiratory function of the participants in the two experimental groups improved in comparison to the control group and the intervention program, irrespective of the type of exercise, played a decisive part in improving the physiological responses.

During the programs the women who participated both in Greek dancing and in aerobics programs exercised at an intensity level of 60% HR and 50% VO_{2max} . Exercise at this level can cause adjustments (ACSM, 2006; Wigaeus & Kildom, 1980). Moreover, previous studies (Zografou & Chysovoulos, 1989) showed that occupying with traditional dancing can cause physiological adjustments, but also foreign researchers who dealt with other forms of dancing (Leger & Gadourg, 1989; Cohen, Segal, Witriol & McArdle, 1982; Clarkson & Skrinar, 1988) came to the same conclusions.

After having studied the physiological responses of the women during the twelve weeks it was found that VO_{2max} from initial to final measurement increases for all groups especially to the two intervention groups. On the contrary, a decrease in HR_{max} can be observed that is something which indicates the improvement of women's physical fitness.

From the results of the present study it is evident that occupying with Greek traditional dancing causes similar cardio respiratory adjustments to an aerobics program. Thus, traditional dancing can be used as an alternative form of exercise and offer similar physiological benefits to those benefits derived from aerobics. The intervention time of the exercise programs (12 weeks) worked positively since the results of the second measurement were higher than the first. Both forms of exercise seem to encourage social contact in the training place and help trainees retain their energy and have better mood.

In conclusion, according to the results of the present study it seems that Greek traditional dancing can constitute a part of group programs of a gym. For a group of people who feel particularly friendly towards Greek cultural tradition such an exercise program would be a pleasant type of exercise, which people of every age could attend easily.

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